

Activity A. Diffusion of Gases

The fact that many gases are colorless and odorless and cannot be seen may give us a misleading image of the properties of gas molecules. An accurate “molecular” picture of gases would show small particles very far away from each other, swarming about in great, rapid, and random motion, and colliding frequently with whatever “walls” the gas may be confined to. What evidence do we have for this “kinetic” picture of gas molecules and the motion of molecules?

Materials

- Ammonia solution, NH_3 , 6M, 3 drops
- Distilled water, dropper bottle
- Phenolphthalein indicator solution, 5 drops
- Divided Petri dish with cover
- White paper

Procedure

1. Safety precaution. DO NOT inhale the ammonia – TOXIC. Keep lids on as much as possible
2. Place the divided petri dish on a sheet of white paper
3. On the left side – mix 5 drops of Phenolphthalein and 5 drops of water
4. On the right side – put 3 drops of the ammonia solution. COVER immediately
5. Observe any changes in the color and appearance of each solution in the Petri dish

Observations and Analysis

1. Describe the initial color and appearance of each solution and any changes that were observed when the Petri dish was covered
2. Assuming that none of the liquids were spilled or contacted each other in any other way, how did the ammonia get to the other side of the petri dish to turn it pink.
3. What evidence does this demonstration provide that gas molecules are moving continuously about and randomly colliding with nearby walls and surfaces?

Activity C. Boyle's Law in a bottle

State Boyle's Law

Materials

- Bicycle pump
- Petroleum Jelly
- Pressure bottle
- Syringe, with tip cap

Procedure

1. Remove the tip cap from the syringe and pull on the plunger to draw about 9mL of air into the syringe. Replace the tip cap to seal the air inside the syringe.
2. Place the sealed syringe inside the 1L pressure bottle
3. Run a small bead of petroleum jelly around the rim of the 1L bottle
4. Cap the bottle with the special tire-valve cap assembly. Tighten the cap securely.
5. Pump air into the bottle.
 - a. As you are pumping. Watch the syringe inside.
 - b. Do not exceed 7 pumps
6. Loosen the cap slowly – Watching the syringe inside

Analysis

1. How did the pressure increase inside of the bottle? (one of the factors)
2. What happened to the syringe inside the bottle when the pressure increased?
3. What type of relationship is pressure and volume?

Activity E – The Thirsty Tube

Materials

- 1 test tube
- 1 small beaker with 20ml colored water
- 1 stopper with tube inserted
- 1 bunsen burner
- 1 test tube holder

Procedure

1. Fill the beaker 20ml of colored water
2. Insert the stopper in the empty test tube
3. Light the burner – heat the test tube for about 90 seconds
4. Flip it upside down into the colored water...wait.

Explain how this works....